A new mutation operation for faster convergence in genetic algorithm feature selection

Abstract

Feature selection is an important step in data elassification because it has a high impact on clossificotun: accuracu. Feature selection 'using Genetic Algorithm (GA) is 'U,'mally done in a wrapper method. The process is time consumuu) especially for large dimensional database. lVe propose a new mutatun: operation for faster [eature selection by GA based on elitism of the allele. Normal elitism in GA preserves the most fit chromosomes which are eval'uated 'using the fitness function. In the same way, the highest fit allele will be preserved and the fitness of the allele is eval'uated based on the freq'ueney of occurrences. The chromosome 'undergoing this mutatiot: process will have a high if not the highest fitness becous« it is created based on a high fit allele. It will be the catalyst to increase the rate of convergence towards achieving an optimal [eature» combination. Erpenmcnts for [eature selection 'using this method are cotuluctcd 'using a database of tropical wood species which has a large variation of [eature«. Results of the experiments show that a high accuracu is obtained for the recognition of the tropical wood species 'using the [eature selection method. In addition, it has also been shown that the chromosomes created by the new mutatiot: operation have high fitness and the rate of optimal connerqence is improved substuutiulls], The new mutatiot: operation is not only 'useful for large database, b'ut also can be 'used for small or ttiednuri sized database.